# NEW PDP-10 FACILITIES

1. NEW FACILITIES

On Tuesday 27 April 1971, a new version of the command decoder will be implemented, together with supporting software. This gives an expanded command capability, and makes available to the remote terminal user a number of new facilities. Included in these are:

(a) Digital plotting

(b) Support for paper tape I/O on Teletypes

(c) Access to files within other projects

(d) A COBOL compiler

(e) Availability of a number of system programs.

Some further details of these facilities are given below. A revision of the Systems User's Guide and a new manual, giving full details of all the new facilities, are currently in production.

2. DIGITAL PLOTTING

The plotter available on the PDP-10 system is a Model 565 CalComp plotter with an eleven inch wide drum, and a step size of .01 inches. An example of the plotter output is shown below.

GRAPH OF Y=EXP(-X/10.0)*SIN(X)
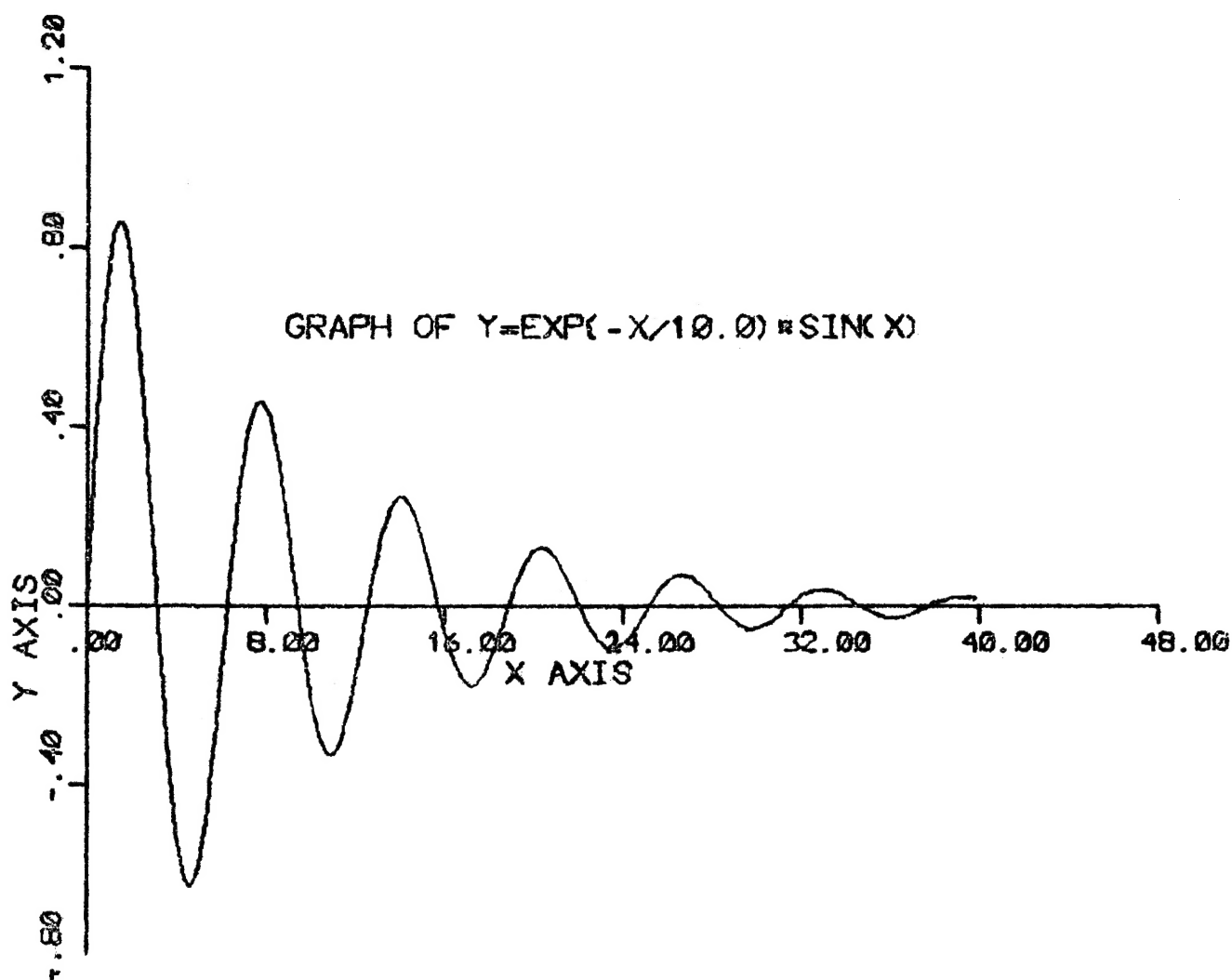
PROJECT 16   20-APR-71 15:25

An initial write up, which gives details of the plotter subroutines, plotter operations and use of the plotter, is available from the Centre's Administrative Officer. Full details of the plotter system are included in a new manual which will be printed shortly.

Users are requested to note the following points with respect to the plotter:

(a) To enable users to become familiar with the use of the plotter and the plotting subroutines, the first four weeks of plotter operation will be free of charge. Standard charges for plotting will begin on 24 May 1971.

(b) All plotter output will be in black ink on plain white paper and will be produced by a 0.2 mm rapidograph pen.

(c) Plotter output will be automatically identified by project number. It will not be left in the output shelves, but should be collected from the Centre's Administrative Officer.

(d) The use of the plotter will, for many users, be their first experience of a symbiont (or spooling) operation. The operation is as follows:

When the command is given to PLOT a data file, that file is not plotted immediately, but is placed in a queue of plot jobs on disk. Subsequently, a symbiont program running under the control of a machine operator runs these plot jobs one at a time producing the graphical output. This mode of operation makes efficient use of the plotter and saves the user time (and money) by not requiring him to wait at his terminal until the plotter is available for his use. Plotted output will normally be available for collection within two hours of termination of the user's job. Details of the PLOT command can be found in section 6.1 (b).

3.   EXTENDED COMMAND FORMAT

The concept of a filename has been extended so that files belonging to any directory may be referenced. A *directory* is a file in its own right. Two or more names can be combined to reference one file. The names are separated by a period. For example:

        directory-1.directory-2.`` `.directory-n,name/proc-prog-name

The file called name/proc-prog-name is to be referenced in directory-n, which in turn is referenced in directory-n-1, and so on.

There are three types of files, each being referenced by a specific type of name, as follows:

(a) Data Files

    Data names comprise up to 6 alphanumeric characters, the first being alphabetic.

examples:

(i)   MYFILE

(ii)   BMDØ2R

(iii)   MYFILE/F4

(b) Project Directory Files

Project directory names comprise up to 6 numeric characters. The name is the project number of a user and this file is his directory.

example:

       124   This refers to the directory of project 124.

(c) System Directory Files

System directory names comprise up to 6 alphanumeric characters preceded by a dollar '$'. I/O for these devices is by reference to the corresponding system directory.

example:

       $ASR   Refers to the paper tape reader and punch on the ASR 33 Teletypes

The only system directories currently recognized are:

       $DSK   A user's disk area

       $TTY   A user's Teletype keyboard and printer

       $ASR   A user's paper tape reader and punch on the ASR 33 type Teletypes

It is intended that any filename may be used anywhere in a command but, for the moment, the character '$' may not be used as the first character in a command.

When using the extended form of a filename defined above, the order of the components must be

       system-directory.project-directory.name/proc-prog-name

examples:

(i) $DSK.124.MYFILE

This command references the filename name MYFILE belonging to project 124 on the device $DSK.

(ii)   124.MYFILE.$DSK

This command is incorrectly ordered and is thus meaningless.

If the system directory name is omitted then $DSK is assumed by default.

example:

271.TEST/F4

This refers to the FORTRAN IV file name TEST/F4 within project 271 on disk.

If the project directory name is omitted, the standard system files are first searched for a file of the name given, and if this fails the user's own project area is assumed.

examples:

(i)   FORTRAN

This references the standard system FORTRAN compiler.

(ii)   TEST/F4

This references the file on the user's own project area.

4. SUPPORT FOR PAPER TAPE I/O ON TELETYPES

All I/O using paper tape must use the COPY command. The paper tape reader and punch are referenced by using the directory name $ASR.

examples:

(i)   COPY TO=NEWFIL FROM=$ASR

Reads a file from the paper tape reader

(ii)   COPY FROM=OLDFIL TO=$ASR

Punches a file onto the paper tape punch

(a) Preparation of tapes

Tapes must be punched on 8-channel paper tape using 7-bit ASCII code with even parity. All records must be terminated by both carriage return (015 ASCII) and line feed (012 ASCII). The tape must be terminated by a control-Z character (032 ASCII). Tapes punched on the remote terminals by the PDP-10 system conform to this standard. No more than one file should be punched on one tape.

(b) Operation of equipment

To feed blank tape on the tape punch:

Turn the Teletype on/off switch to 'LOCAL'
Press the tape punch 'ON' button
Press the keyboard 'HERE IS' button a number of times
Press the tape punch 'OFF' button
Turn the Teletype on/off switch to 'LINE'

If these instructions are not followed, spurious characters will be punched.

(c) Control settings on the reader and punch

The computer will automatically start and stop the reader and punch when
it is ready to perform I/O after a COPY command. The user must not
switch either reader or punch 'ON' with the Teletype in 'LINE' mode.

Thus, the reader on/off switch should be in the 'STOP' position and the
punch 'OFF' button should be down.

5. ACCESS TO FILES WITHIN OTHER PROJECTS

To access a file within another project, quote the project number in the filename.

examples:

(i)   COPY 362.HISFIL, MYFILE

This copies a file on project 362 to a file on the user's own area

(ii)   DIRECTORY 362

This lists the directory of project 362

(iii)   FORTRAN (LIST) IN-110.SRCFIL BIN=BINFIL LST=LSTFIL

The file SRCFIL obtained from project number 110 is compiled, producing
relocatable and list files on the user's own area

(iv)   21.AFILE/F4

This is an automatic compilation of the FORTRAN file obtained from project
number 21

The file to be accessed on some other project's directory must be so permitted
that access to it is allowed. To read a file, that file must be at least READ
permitted.

Permissions are set for two classes of users:

(i)   the owner of the project

(ii)   all other users (the world)

The permissions are:

FREE   the user can read, write and change permission

WRITE   the user can read and write

READ   the user can read

NONE   the user cannot do anything.

For the world, all these permissions are distinct. For the owner, WRITE is equivalent to FREE and NONE is equivalent to READ. The owner can always read his own files and change their permission.

When a file is created, the permission is automatically set to

OWNER=FREE   WORLD=NONE

Permissions are set by the PERMIT command. There are now two options to the PERMIT command with assignments OWNER and WORLD.

examples:

(i)   PERMIT(OWNER=READ, WORLD=NONE) FILEA, FILEB(WORLD=READ,FILEC(OWNER=FREE)

(ii)   PER(R,N) FILEA, FILEB(WORLD=R), FILEC(F)

        For FILEB, READ is assumed for the owner.

        For FILEC, NONE is assumed for the world.

6. NEW AND EXTENDED COMMANDS

This version of the decoder provides a number of new commands, together with new options and arguments for some existing commands. These are briefly outlined below. Full details of all these will be included in revision 1 to the System User's Guide.

6.1 New Commands

(a) COBOL

A COBOL compiler is now available on the PDP-10 system. The command to use COBOL is

$$\text{COBOL}\left(\begin{matrix}\text{BIN} \\ \text{NOBIN}\end{matrix}\text{'}\begin{matrix}\text{LIST} \\ \text{NOLIST}\end{matrix}\text{,MACRO,MAP}\right)$$

{IN=}filename-1,{BIN=}filename-2,{LST=}filename-3

filename-1 is the name of the source file
filename-2 is the name of the resulting relocatable file
filename-3 is the name of the list file

Automatic compilation will work using the processor program name CBL.

(b) PLOT

This is used for transmitting plot output files to the plotter symbiont. The command is

        PLOT filename-1, ..., filename-n

filename-1, ..., filename-n are the names of the data files output by the plotter subroutines.

(c) MACRO

MACRO is the assembly language for the PDP-10. The MACRO command is

$$\text{MACRO}(\begin{smallmatrix}\text{BIN}\\\text{NOBIN}\end{smallmatrix}, \text{CREF}, \begin{smallmatrix}\text{LIST}\\\text{NOLIST}\end{smallmatrix})$$

{IN=}filename-1,{BIN=}filename-2,{LST=}filename-3

filename-1 is the name of the source file
filename-2 is the name of the resulting relocatable file
filename-3 is the name of the list file

Automatic compilation willwork using the processor program name MAC.

(d) COMPARE

COMPARE compares two ASCII files and outputs the differences between the two.

$$\text{COMPARE}\{\begin{smallmatrix}\text{FILE1}\\\text{F1}\end{smallmatrix}=\}\text{filename-1},\{\begin{smallmatrix}\text{FILE2}\\\text{F2}\end{smallmatrix}=\}\text{filename-2},\{\text{LST}=\}\text{filename-3}$$

If the LST argument is omitted, the third file appears on the Teletype.

6.2 New Options in Existing Commands

Existing commands

(a) COPY

$$\text{COPY }(\begin{smallmatrix}\text{ASCII}\\\text{BIN}\end{smallmatrix}, \text{COMPRESS})$$

ASCII for copying files of ASCII characters

BIN for copying relocatable files

COMPRESS removes sequence numbers and trailing blanks from ASCII records, and converts multiple spaces to tabs.

(b) PERMIT

These details have been given in section 5.

(c) RUN

$$\text{RUN}(\begin{smallmatrix}\text{MAP}\\\text{NOMAP}\\\text{SYMBOL}\end{smallmatrix}, \text{DDT})$$

This will run the named files with the debugging package DDT.

6.3 New Arguments in Existing Commands

(a) DIRECTORY

The DIRECTORY command can now have an argument string which specifies selective listing of part of a directory.

example:

        DIRECTORY ALL/F4

    This will list all files with the processor program name of F4

(b) FORTRAN

Three arguments can now be used in the FORTRAN command.

$$\text{FORTRAN}(^{BIN}_{NOBIN}, ^{CREF}, ^{LIST}_{NOLIST}, MACRO)$$

    {IN=}filename-1,{BIN=}filename-2,{LST=}filename-3

    filename-1 is the name of the source file
    filename-2 is the name of the resulting relocatable file
    filename-3 is the name of the list file

7. AVAILABILITY OF SYSTEM PROGRAMS

In addition to the system facilities outlined above, the following DEC system programs are now available.

        BINCOM

        CHESS

        FUDGE2

        LOADER

        PIP

        RUNOFF

        SORT

        TECO

These programs can be obtained simply by entering the program name In most cases the program will return an asterisk to the Teletype and wait for the necessary DEC command string to be entered.

Users should not use any of the above names for their own files.

8. SOFTWARE CLASSIFICATION

A statement in the April issue of the Computer Cetnre Bulletin outlined four categories or types under which it was intended to classify all the software available on the PDP-10 system.

Briefly, the categories are as follows:

Type 1   System software that has been formally tested, is documented, and is supported with educational and consulting services.

Type 2   Application programs that have been formally tested, documented and are supported with educational and consulting services.

Type 3   Programs of general interest that satisfy basic standards of testing and documentation. These programs are given some support but this support has low priority.

Type 4   Programs that are made available in the author's original form and have not been tested. These programs attract no support.

The following system programs and facilities have now been classified as Type 1 programs.

(a)   System programs and compilers

The Monitor
LOGIN
FINISH
Command Decoder
Batch
Editor
FORTRAN
BASIC
FORTRAN library (including the plotter and overlay subroutines)
ACCOUNT
PASSWORD

(b)   The facilities available via the following commands

COPY
DAYTIME
DELETE
DIRECTORY
KEEP
OVERLAY
PERMIT
PLOT
RENAME
TIME
TYPE
RUN (excluding the DDT opetion)

All other programs and facilities at present are classified as Type 4 programs.